

**Clean Version of Pending Claims 1-3, 6-19, 22-34, 36-40 and 43-46**

1 (Once amended). A blood processing system comprising  
a donor flow channel to convey fluid to and from a donor,  
a blood processing flow channel including a blood separation chamber to separate a  
blood component from donor blood,  
a blood component collection flow channel including a blood component collection  
container,  
a pump station communicating with the donor flow channel, the blood processing flow  
channel, and the blood component collection flow channel,  
a controller to operate the pump station in multiple modes, including a processing mode,  
during which the pump station is operated to convey blood in the donor flow channel into the blood  
processing flow channel for separation of the blood component in the blood separation chamber,  
and a collection mode, during which the pump station is operated to convey at least some of the  
blood component in the blood processing flow channel into the blood component collection flow  
channel for collection in the blood component collection container, and a blood component return  
mode, during which the pump station is operated to convey at least some of the blood component in  
the blood processing flow channel into the donor flow channel for return to the donor, and  
a utility flow channel including a processing fluid container,  
the pump station communicating with the utility flow channel, and  
the controller configured to operate the pump station during the blood component return  
mode to convey processing fluid in the utility flow channel into the donor flow channel for mixing with  
the blood component returned to the donor.

2 (Once amended). A system according to claim 1 or 7  
wherein the blood component collection flow channel includes a filter to remove  
undesired materials from the blood component before entering the blood component collection  
container.

3. A system according to claim 2  
wherein the filter removes leukocytes.

6 (Once amended). A system according to claim 1  
wherein the processing fluid includes saline.

7 (Once amended). A blood processing system comprising  
a donor flow channel to convey fluid to and from a donor,  
a blood processing flow channel including a blood separation chamber to separate a

blood component from donor blood,

a blood component collection flow channel including a blood component collection container,

a pump station communicating with the donor flow channel, the blood processing flow channel, and the blood component collection flow channel,

a controller to operate the pump station in multiple modes, including a processing mode, during which the pump station is operated to convey blood in the donor flow channel into the blood processing flow channel for separation of the blood component in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the blood component in the blood processing flow channel into the blood component collection flow channel for collection in the blood component collection container, and

a utility flow channel including a processing fluid container,

the pump station communicating with the utility flow channel, and

the controller configured to operate the pump station in a processing fluid transfer mode, during which the pump station is operated to convey processing fluid in the utility flow channel into the blood processing flow channel or the blood component collection flow channel for mixing with the blood component.

8. A system according to claim 7

wherein the processing fluid includes a blood component additive.

9 (Once amended). A system according to claim 1 or 7

wherein the pump station includes a fluid pressure actuated pump and an actuator to apply fluid pressure to the pump, and

wherein the controller is coupled to the actuator.

10 (Once amended). A system according to claim 1 or 7

wherein the pump station, the donor flow channel, the blood processing flow channel, and the blood component collection flow channel communicate within a cassette.

11. A system according to claim 10

further including an actuator to receive the cassette and operate the pump station, and wherein the controller is coupled to the actuator.

12 (Once amended). A system according to claim 1 or 7

wherein the blood processing flow channel includes a blood component holding container to hold the blood component, and

wherein, in the collection mode, the pump station is operated to convey at least some of

the blood component in the blood component holding container into the blood component collection flow channel.

13. A system according to claim 12

wherein the controller operates the pump station in a blood component return mode, during which the pump station is operated to convey at least some of the blood component in the blood component holding container into the donor flow channel for return to the donor.

14 (Once amended). A system according to claim 1 or 7

wherein the blood processing flow channel includes a donor blood holding container to hold donor blood prior to separation in the blood separation chamber, and

wherein, in the processing mode, the pump station is operated to convey blood in the donor flow channel into the donor blood holding container.

15. A system according to claim 14

further including a second pump station, independent of the first defined pump station, communicating with the donor blood holding container and the blood separation chamber and operating to convey donor blood from the donor blood holding container in the blood separation chamber for separation in the blood component.

16 (Once amended). A system according to claim 1 or 7

wherein the pump station comprises first and second fluid pressure actuated pump stations, and a fluid pressure actuator operating to selectively apply fluid pressure pump strokes in tandem to the first and second pump stations to convey fluid from a source to a destination,

wherein, during at least one of the multiple modes, the controller switches between a first flow state, in which the pump strokes draw a fluid volume into the first pump station from the source and expel a fluid volume from the second pump station to the destination, and a second flow state, in which the pump strokes draw a fluid volume into the second pump station from the source and expel a fluid volume from the first pump station to the destination, the control function operating to synchronize the pump strokes so that fluid flow from the source is essentially continuous while fluid flow to the destination is pulsatile.

17 (Once amended). A system according to claim 1 or 7

wherein the blood component comprises red blood cells.

18 (Once amended). A system according to claim 1 or 7

wherein the blood component comprises plasma.

19 (Once amended). A blood processing system comprising

a donor flow channel to convey fluid to and from a donor,

a blood processing flow channel including a blood separation chamber to separate red blood cells from donor whole blood,

a blood component collection flow channel including a red blood cell collection container and an in-line filter to remove leukocytes from the red blood cells before entering the red blood cell collection container,

a pump station communicating with the donor flow channel, the blood processing flow channel, and the blood component collection flow channel,

a controller to operate the pump station in multiple modes, including a processing mode, during which the pump station is operated to convey whole blood in the donor flow channel into the blood processing flow channel for separation of the red blood cells in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the blood component collection flow channel for on-line removal of leukocytes and collection in the red blood cell collection container, and a blood component return mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the donor flow channel for return to the donor, and

a utility flow channel including a processing fluid container,

the pump station communicating with the utility flow channel, and

the controller configured to operate the pump station during the blood component return mode to convey processing fluid in the utility flow channel into the donor flow channel for mixing with the red blood cells returned to the donor.

22 (Once amended). A system according to claim 19  
wherein the processing fluid includes saline.

23 (Once amended). A blood processing system comprising  
a donor flow channel to convey fluid to and from a donor,  
a blood processing flow channel including a blood separation chamber to separate red blood cells from donor whole blood,  
a blood component collection flow channel including a red blood cell collection container and an in-line filter to remove leukocytes from the red blood cells before entering the red blood cell collection container,  
a pump station communicating with the donor flow channel, the blood processing flow channel, and the blood component collection flow channel,  
a controller to operate the pump station in multiple modes, including a processing mode,

during which the pump station is operated to convey whole blood in the donor flow channel into the blood processing flow channel for separation of the red blood cells in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the blood component collection flow channel for on-line removal of leukocytes and collection in the red blood cell collection container, and

a utility flow channel including a processing fluid container,

the pump station communicating with the utility flow channel, and

the controller configured to operate the pump station in a processing fluid transfer mode, during which the pump station is operated to convey processing fluid in the utility flow channel into the blood processing flow channel or the blood component collection flow channel for mixing with the red blood cells.

24. A system according to claim 23

wherein the processing fluid includes a red blood cell additive.

25. A system according to claim 19

wherein the pump station includes a fluid pressure actuated pump and an actuator to apply fluid pressure to the pump, and

wherein the controller is coupled to the actuator.

26. A system according to claim 19

wherein the pump station, the donor flow channel, the blood processing flow channel, and the blood component collection flow channel communicate within a cassette.

27. A system according to claim 26

further including an actuator to receive the cassette and operate the pump station, and wherein the controller is coupled to the actuator.

28 (Once amended). A blood processing system comprising

a donor flow channel to convey fluid to and from a donor,

a blood processing flow channel including a blood separation chamber to separate red blood cells from donor whole blood,

a blood component collection flow channel including a red blood cell collection container and an in-line filter to remove leukocytes from the red blood cells before entering the red blood cell collection container,

a pump station communicating with the donor flow channel, the blood processing flow channel, and the blood component collection flow channel, and

a controller to operate the pump station in multiple modes, including a processing mode,

during which the pump station is operated to convey whole blood in the donor flow channel into the blood processing flow channel for separation of the red blood cells in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the blood component collection flow channel for on-line removal of leukocytes and collection in the red blood cell collection container,

the pump station comprising first and second fluid pressure actuated pump stations, and a fluid pressure actuator operating to selectively apply fluid pressure pump strokes in tandem to the first and second pump stations to convey fluid from a source to a destination,

wherein, during at least one of the multiple modes, the controller switches between a first flow state, in which the pump strokes draw a fluid volume into the first pump station from the source and expel a fluid volume from the second pump station to the destination, and a second flow state, in which the pump strokes draw a fluid volume into the second pump station from the source and expel a fluid volume from the first pump station to the destination, the control function operating to synchronize the pump strokes so that fluid flow from the source is essentially continuous while fluid flow to the destination is pulsatile.

29 (Once amended). A blood processing method comprising the steps of  
coupling a multi-function pump station to a donor flow channel to convey fluid to and from a donor, a blood processing flow channel including a blood separation chamber to separate a blood component from donor blood, and a blood component collection flow channel including a blood component collection container,

operating the pump station in multiple modes, including a processing mode, during which the pump station is operated to convey blood in the donor flow channel into the blood processing flow channel for separation of the blood component in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the blood component in the blood processing flow channel into the blood component collection flow channel for collection in the blood component collection container,

coupling the pump station to a utility flow channel including a processing fluid container,  
and

operating the pump station in a processing fluid transfer mode, during which the pump station is operated to convey a processing fluid in the utility flow channel into the blood processing flow channel or the blood component collection flow channel for mixing with the blood component.

30. A method according to claim 29

wherein, in operating the pump station in the collection mode, the blood component is

passed through an in-line filter in the blood component collection flow channel to remove undesired materials from the blood component before entering the blood component collection container.

31. A method according to claim 30  
wherein the filter removes leukocytes.

32. A method according to claim 29  
further including operating the pump station in a blood component return mode, during which the pump station is operated to convey at least some of the blood component in the blood processing flow channel into the donor flow channel for return to the donor.

33 (Once amended). A method according to claim 29  
further including operating the pump station during the blood component return mode to convey a processing fluid in the utility flow channel into the donor flow channel for mixing with the blood component returned to the donor.

34. A method according to claim 33  
wherein the processing fluid includes saline.

36 (Once amended). A method according to claim 29  
wherein the processing fluid includes a blood component additive.

37. A method according to claim 29  
wherein the blood component comprises red blood cells.

38. A method according to claim 29  
wherein the blood component comprises plasma.

39. A method according to claim 29  
wherein the pump station comprises first and second fluid pressure actuated pump stations, and a fluid pressure actuator operating to selectively apply fluid pressure pump strokes in tandem to the first and second pump stations to convey fluid from a source to a destination,

wherein, during at least one of the multiple modes, operation of the pump station is switched between a first flow state, in which the pump strokes draw a fluid volume into the first pump station from the source and expel a fluid volume from the second pump station to the destination, and a second flow state, in which the pump strokes draw a fluid volume into the second pump station from the source and expel a fluid volume from the first pump station to the destination, the control function operating to synchronize the pump strokes so that fluid flow from the source is essentially continuous while fluid flow to the destination is pulsatile.

40 (Once amended). A red blood cell processing method comprising the steps of  
coupling a multi-function pump station to a donor flow channel to convey fluid to and

from a donor, a blood processing flow channel including a blood separation chamber to separate red blood cells from donor whole blood, and a blood component collection flow channel including a red blood cell collection container and an in-line filter to remove leukocytes from the red blood cells before entering the red blood cell collection container,

operating the pump station in multiple modes, including a processing mode, during which the pump station is operated to convey whole blood in the donor flow channel into the blood processing flow channel for separation of the red blood cells in the blood separation chamber, and a collection mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the blood component collection flow channel for on-line removal of leukocytes and collection in the red blood cell collection container, and a blood component return mode, during which the pump station is operated to convey at least some of the red blood cells in the blood processing flow channel into the donor flow channel for return to the donor,

coupling the pump station to utility flow channel including a processing fluid container, and

operating the pump station during the blood component return mode to convey a processing fluid in the utility flow channel into the donor flow channel for mixing with the red blood cells returned to the donor.

43 (Once amended). A method according to claim 40  
wherein the processing fluid includes saline.

44 (Once amended). A method according to claim 40

further including operating the pump station in a processing fluid transfer mode, during which the pump station is operated to convey a processing fluid in the utility flow channel into the blood processing flow channel or the blood component collection flow channel for mixing with the red blood cells.

45. A method according to claim 44  
wherein the processing fluid includes a red blood cell additive.

46. A method according to claim 40

wherein the pump station comprises first and second fluid pressure actuated pump stations, and a fluid pressure actuator operating to selectively apply fluid pressure pump strokes in tandem to the first and second pump stations to convey fluid from a source to a destination, and

wherein, during at least one of the multiple modes, operation of the pump station is switched between a first flow state, in which the pump strokes draw a fluid volume into the first



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pump station from the source and expel a fluid volume from the second pump station to the destination, and a second flow state, in which the pump strokes draw a fluid volume into the second pump station from the source and expel a fluid volume from the first pump station to the destination, the control function operating to synchronize the pump strokes so that fluid flow from the source is essentially continuous while fluid flow to the destination is pulsatile.